PROPOSED
Reviewed by: CS
October 21, 2005

Covered Source Permit Review No. 0332-01-C
Application for a Significant Modification No. 0332-03
320 TPH Stone Quarrying and Processing Plant

Applicant: Kauai Aggregates (aka O. Thronas Inc.)

Equipment Description:
The modification includes the following equipment changes:

Remove 750 kW Caterpillar diesel engine generator [DEG] (model no. Denver 349, serial no. 61P482, max. 56 gal/hr fuel oil no. 2);

Add 1,576 HP Caterpillar DEG (model no. 3512 DI TA JWAC, serial no. 24Z01240, max. 79.4 gal/hr fuel oil no. 2, manuf. 1980's)

General Information: No change.

Proposed Project:
The general description (SICC 1442) is to process stone material via front-end loaders, conveyors, crushers, and screens.

The only proposed change is to switch the DEGs. The hour limit will remain at 3,000 hours on a rolling 12-month basis.

This permit review is based on the application dated September 26, 2005. The application fee of $500 for a significant modification (<40 tpy of criteria pollutants and <1tpy of HAPs) for a non-major CSP has been processed and the receipt will be issued with the permit. Except for the new DEG, all other permit conditions will remain unchanged in CSP No. 0332-01-C dated July 8, 2004.

Air Pollution Controls:
Not applicable to the DEG.

Applicable Requirements:
No change.

Non-Applicable Requirements:
No change.

A Best Available Control Technology (BACT) analysis is required for new sources or modifications to existing sources that would result in a net significant emissions increase as defined in HAR, Section 11-60.1-1. This is an existing source with no significant increase in emissions (see **TABLE 1**). Therefore, a BACT analysis was not performed.

Insignificant Activities/Exemptions:
No change.

Alternative Operating Scenarios:

No change.

Project Emissions:

The 3,000 hr/yr limit will remain. Therefore, 'netting' is required to determine if there is a significant increase in emissions (new potential vs. the average of the previous 2 years' actual emissions). The calculations of potential emissions verified with DOH, however the applicant used the potential emissions of the 750 kW DEG to calculate the increase in emissions. The average of the previous 2 years' actual emissions were calculated as shown in **TABLE 1.**

The following current AP-42 emission factors were used in this review:
3.4 - Large Stationary Diesel and all Stationary Dual-Fuel Engines (10/96)

TABLE 1 - POTENTIAL INCREASE IN EMISSIONS

	750 kW DEG				1,576 HP DEG 3,000 hrs (tpy)	Net [3] (+/-) (tpy)	Sig. Increase (tpy)
	3,000 hrs (tpy)	2003 Actual[1] (tpy)	2004 Actual[2] (tpy)	2 Yr Ave. Actual (tpy)			
SO_2	5.81	2.12	2.49	2.31	8.46	6.15	≥40
NO_x	36.83	13.42	15.81	14.62	52.23	37.61	≥40
CO	9.78	3.56	4.20	3.88	13.87	9.99	≥100
PM	1.15	0.42	0.49	0.46	1.63	1.17	≥25
$PM_{10}/PM_{2.5}$	1.15	0.42	0.49	0.46	1.63	1.17	≥15
VOC	1.04	0.38	0.45	0.41	1.47	1.06	≥40
HAPs	0.05	0.02	0.02	0.02	0.07	0.05	n/a

Note:

1. 2003 emissions were based on 1,093 hr/yr of operation as reported by Kauai Aggregates.
   Example Calc: 36.83 tpy x 1,093 hr / 3,000 hr/yr = 13.42 tpy NO_x.

2. 2004 emissions were based on 1,288 hr/yr of operation as reported by Kauai Aggregates.
   Example Calc: 36.83 tpy x 1,288 hr / 3,000 hr/yr = 15.81 tpy NO_x.

3. Net is the difference of the new potential minus the previous 2-yr average.
   Example Calc: 52.23 tpy - 14.62 tpy = 37.61 tpy NO_x.

Ambient Air Quality Assessment:

A new ambient air quality assessment (AAQA) was conducted by the applicant's consultant using an EPA SCREEN3 model version 96043 to determine source compliance with national and state ambient air quality standards (NAAQS and SAAQS). This AAQA included the new DEG's parameters with the same terrain parameters. The model, methodology and assumptions employed in the AAQA have been determined to be consistent with state and federal guidelines and are discussed below.

SCREEN3 was run with the regulatory default option selected. The default options include the use of rural dispersion coefficients, stack tip downwash, default wind speed profile exponents, upper bound concentrations for downwash, and the calm processing routine. The default full meteorology was also selected and 298° K was used as the ambient temperature.

Modeling was performed using radial lines from the DEG stack with discrete distances starting from the fence line. The terrain generally slopes upward towards the north. There is a high quarry wall on the north and east, a ravine on the west, and a downward slope to the south. The previous AAQA assumed that the fence line was 274m for both simple and complex terrain impacts. This accounts for the ravine (for simple terrain) and the nearest quarry wall (for complex terrain). The modeled maximum concentration was found to be at 274m (fenceline atop the quarry wall at a height of 26m) for complex terrain.

A Good Engineering Practice (GEP) stack height analysis was performed using the dimensions of all nearby structures and buildings (i.e., height, width, length, and distance to stack). The results of the analysis showed that the physical stack height of the diesel engine was less than the GEP formula stack height. Therefore, the dimensions of the structure of greatest impact (the cone crusher - same as the previous AAQA) was used in the model.

TABLE 2 presents the potential to emit/allowable emission rates and stack parameters of the DEG used in the AAQA. The derivation of SO_2, NO_x, CO, and PM_{10} emission rates were previously discussed in the **Project Emissions** subsection. Lead and hydrogen sulfide emissions are negligible.

The predicted concentrations presented in **TABLE 3** includes permit limitations of 3,000 hr/yr and that 75 percent of emitted NO_x will be converted to NO_2. Based on these assumptions, the facility should comply with NAAQS and SAAQS for SO_2, NO_2, CO, and PM_{10}.

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TABLE 2
SOURCE EMISSION RATES AND STACK PARAMETERS FOR AIR MODELING

SOURCE		EMISSION RATES					STACK PARAMETERS			
Equipment	Stack No.	SO_2 (g/s)	NO_x (g/s)	CO (g/s)	PM_{10} (g/s)	Pb (g/s)	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
1,576 HP DEG	1	0.7103	4.3869	1.1653	01371	--	4.27	802.4	42.055	0.356

TABLE 3
PREDICTED AMBIENT AIR QUALITY IMPACTS

AIR POLLUTANT	AVERAGING TIME	IMPACT ($\mu g/m^3$)	BACKGROUND [1] ($\mu g/m^3$)	TOTAL IMPACT ($\mu g/m^3$)	AIR STANDARD ($\mu g/m^3$)	PERCENT STANDARD	IMPACT LOCATION (R) [2]
SO_2	3-Hour	89.575	17	107	1300	8%	274
	24-Hour	39.811	7	47	365	13%	274
	Annual [3]	6.817	1	8	80	10%	274
NO_2	Annual [3, 4]	31.577	9	41	70	58%	274
CO	1-Hour	163.282	2394	2557	10000	26%	274
	8-Hour	114.297	983	1097	5000	22%	274
PM_{10}	24-Hour	7.684	28	36	150	24%	274
	Annual [3]	1.316	16	17	50	35%	274
Pb	Calendar Quarter	--	--	--	1.5	--	--
H_2S	1-Hour	--	--	--	35	--	--

Note:
1. The background concentrations were taken from Hawaii Air Quality Data 2004 at Lihue for PM_{10} and Kapolei for all other pollutants.
2. (R) is the distance to the receptor of maximum impact which is located at the fenceline atop the quarry wall.
3. The Annual concentrations are based on a limitation of 3,000 hours in any rolling 12-month period.
4. The ARM Method was used to calculate NO_2 concentrations (0.75 x NO_x).

Other Issues:

Kauai Aggregates has been operating on the alternate operating scenario to temporarily replace the DEG since June 2005. The damaged DEG is beyond repair and will be replaced with this proposed DEG upon issuance of this permit.

Significant New Permit Conditions:

No change in permit conditions except for the equipment description to switch DEGs.

Conclusion and Recommendation:

In conclusion, it is the Department of Health's preliminary determination that the facility will comply with all State and Federal laws, rules, regulations, and standards with regards to air pollution. This determination is based on the application submitted by Kauai Aggregates. Therefore, a significant modification to a covered source permit for Kauai Aggregates is recommended subject to the following:

1. above permit conditions;
2. 30-day public notice period; and
3. 45-day EPA review period.